REMARKS/ARGUMENTS

In the Office action dated April 3, 2007, the Examiner objected to the Abstract of the Disclosure, stating that the Abstract "...reads like a claim." The Examiner did not cite any specific language, however, it is acknowledged that, while the Abstract does not contain claim words, *e.g.*"said," it is a single sentence. The Examiner provide a listing of what should be contained in an abstract, which is fully met by the Abstract as filed. Applicant has, however, broken the Abstract into separate sentences in the hopes that this will satisfy the Examiner.

The Examiner objected to the claim number, and it is acknowledged that "13" was used for two claims. The claims are amended to correct this deficiency.

Turning to the merits of the Office action, the Examiner rejected claims 1-21, all of the claims present in the Application, under 35 U.S.C. § 103(a) as being unpatentable over U. S. Patent No. 6,516,000 B1 to Kshirsager *et al.* (hereinafter '000) in view of U. S. Patent No. 6,295,276 B1 to Datta *et al.* (hereinafter '276).

In the Specification, paragraph 0035 is amended to correct a typographic error and the Abstract is amended.

In the Claims, claims 1, 2 and 14-21 are amended.

The Invention

The invention is a method of routing traffic within, onto, and off of, a power line based network. The invention provides a method of interworking packets received at the edge of a PLC network by PLC MAC bridges so that packets may efficiently traverse between the PLC LAN and differing network technologies. A PLC bridge interconnection station is attached to separate physical LANs such that the other stations on the LAN are unaware that they are

communicating over differing LAN technologies.

During the connection setup process, the method of the invention specifies the transfer of information elements to the terminating stations on the PLC LAN so that subsequent transfers of bearer, or user data packet, traffic across the PLC LAN use identical encoding, regardless of the user data packet traffic's bridging requirements. The bridging method of the invention stores information about source and destination stations for a connection at a PLC bridge device. This local store of end-station information allows the PLC bridge to properly interwork packets on or off of the PLC LAN, without the necessity of embedding the information in individual packets, and without the need to resort to a central controller to find this information.

The PLC LAN of the method of the invention uses temporary equipment identifiers (TEI) in place of MAC addresses to reduce the amount of overhead in sending data packets over a PLC LAN. TEIs are only valid within the confines of the PLC LAN. Data packets which are received from non-PLC LANs, or which are to be sent over non-PLC LANs, must be modified by a PLC device, *e.g.*, a PLC MAC bridge, at the edge of the PLC LAN to be compatible with the non-PLC LAN. In the method of the invention, a PLC MAC bridge device, acting in concert with a PLC Central Coordinator (PLC CC), manages the assignment of TEIs, bridging tables, and ConnectionID to enable the proper labeling of data packets for transmission over PLC and non-PLC LANs.

The Applied Art

U. S. Patent No. 6,516,000 B1 to Kshirsager *et al.* describes an ATM network over IP. In this instance, "ATM" stand for Asynchronous Transfer Mode; not Automated Teller

Machine. '000 describes a system wherein virtually every action is under the control and supervision of a central controller.

U. S. Patent No. 6,295,276 B1 to Datta *et al.* describes a network which incorporates a number of routers.

The Claims

To summarize some important differences between the method of the invention and '000: '000 is a central control system in that all MAC addresses are stored in the central server and the central server makes all connections. It may use caches in other parts of the network, but it is ultimately responsible for connections and routing. The method of the invention frees the central server, the PLC central coordinator, by allowing the various bridging devices to route traffic.

The '000 server translates MAC addresses to VCIs, but encapsulates the MAC address, which always stays with the packet. The method of the invention strips the MAC address from packets for intra-LAN excursions, and uses a ConnectionID to route packets.

The '000 server establishes all connections. The method of the invention establishes connections on the destination side of the network.

Claim 1 recites, among other elements, a temporary equipment identifier. The Examiner states that '000 col. 7, lines 35-50 teaches such a device. The applied portion of '000 describes a CRP server, LE-CRPs and an LE end point. None of these items is equivalent to Applicant's TEI, which replaces the MAC address within a power line LAN. '000 describes resolution of a target MAC address, which, again, does not replace the MAC address with another designation for use within a LAN. Claim 1 is allowable as originally filed.

Claim 2 recites that the method of the invention uses a ConnectionID in place of a MAC address for any packet traversing the PLC LAN. '000 col. 10, lines 40-52 is applied. This portion of '000 describes data flow from shared-media host 715 to ATM host 730 using host 730's MAC address. There is no teaching nor suggestion of anything in this portion of '000 of replacing the MAC address with a ConnectionID, as required by claim 2. Claim 2 is clearly allowable over the applied art.

Claim 3 recites provision of a PLC MAC bridging device for storing information about the source station and the destination station for a connection at the PLC bridge device. '000 col. 9, lines 37-45 is applied. The claim requires that the bridging device store information; '000 describes a bridging device which checks all caches to determine on which port the frame will be transmitted. There is no storing by '000 in a bridging device. The statement that the MAC address is transmitted on legacy ports suggests that this is done for a LAN such as an ethernet LAN. There is no teaching nor suggestion in the applied portion which renders the claimed invention obvious. Claim 3 is allowable over the applied art.

Claim 4 recites that the PLC MAC bridging device caches a source TEI and a source 48-bit MAC address of all broadcast data packets received from other bridge devices on the same PLC LAN. '000 col. 12, lines 28-42 are applied. There is no explanation by the Examiner as to how the applied language of '000 renders the claimed invention obvious. The applied portion of '000 describes an ARP request which causes an LE-CRP to request a MAC multicast address. This allegedly results in a response from the ATM source host with a virtual channel identifier (VCI). Perhaps the Examiner is equating the VCI with Applicant's TEI, however, such a substitution is not correct, as the VCI of '000 is clearly described at col. 1, line

49-col. 2, line 27, wherein it is made clear that VCI is a mapping or routing device, and is not a TEI, as defined in Applicant's Specification, which is a substitute for a MAC address, used intra-LAN. Claim 4 is allowable over the applied art.

Claim 5 recites that a PLC MAC bridge establishes a connection for bridged traffic only when traffic from a non-PLC LAN source station is received for a destination station on the PLC LAN where the destination station's TEI, bridge TEI and destination station 48-bit MAC address are cached in the bridge. '000 col. 10, lines 38-59 is applied. Part of this applied portion has been previously cited as describing data flow from shared-media host 715 to ATM host 730 using host 730's MAC address. The applied portion goes on to state that:

> The LE-CRP server 720 does not need to check for prior connections to the host or save state information since the ATM connections are already cached in bridge 710. LE-CRP server 720 then returns the VCI of the new connection to bridge 710, which puts it into its ATM cache 711. Col. 10, lines 47-52

A reasonable interpretation of the applied language is that, as the system of '000 stores virtually everything in a central server, that it is this central server which stores all address, and that asking a PLC MAC bridge for anything in '000 would not produce a viable result, assuming that '000 has a PLC MAC bridge, which is does not. The bridges of the method of the invention cache a TEI and ConnectionIDs, allowing the PLC MAC bridge to establish a connection for bridged traffic. '000 does not appear to perform this function. '000 must always return to its central server for address information, which may be passed to a bridging device, but which is not stored therein, and which, therefore, cannot establish the connection as recited in claim 5. Claim 5 is allowable over the applied art.

Claim 6 recites that a PLC MAC bridge establishes a connection for bridged traffic

only when traffic from a PLC LAN source station is received for a destination station not on the PLC LAN where the bridge TEI and destination station 48-bit MAC address are cached in the bridge. '000 Fig. 6 and col. 9, line 46 through col. 10 line 38 are applied [It should be noted that the Office actions states col. 6, lines 46-67 through col. 10 lines 1-38. Applicant believes the Examiner meant to apply cols. 9 and 10, as it is this portion of '000 which describes Fig. 6. If this is not correct, Applicant asks that the Examiner re-issue a corrected Office action.] The applied portion of '000 describes a setup from the source side of a LAN, whereas the claim language clearing recites that the invention provides a setup from a destination side. Also, the TEI and destination station 48-bit MAC address is cached in the bridge of the invention, while '000 maintains MAC addresses in the central server and in a bridge, but must check *ALL* caches, including caches in all bridges and in the central server. See col. 9, lines 37-45, immediately preceding the portion of '000 applied by the Examiner in rejecting claim 6. Claim 6 is allowable over the applied portion of '000.

Claim 7 recites establishing a unique connection for every pair of stations that cross a PLC MAC bridge. '000 col. 9, lines 37-51. The Examiner is correct that the VCI associated with the requested MAC address is a unique connection, however, the connection is solitary: "...LE-CRP server 620 returns the VCI of the connection to bridge 630...." It is instructive that "VCI" and "connection' are both written in the singular. It is clear that a single connection is provided and that all traffic must move over this single connection. The claim clearly requires a unique connection for every pair of stations. Using Applicant's Fig. 2 and an example, stations A, B and C each have a unique connection to each of stations C and D, or, doing the math, there are six connections across the PLC MAC. This is much different than

providing a single, shared connection as is done in '000. Claim 7 is allowable over the applied art.

Claim 8 recites that the method of the invention includes bridging packets across the PLC LAN only in PLC bridging devices. "Bridged packets" are define in the Specification, page 5, line 21 through page 6, line 4, as a packet which has the full 48-bit MAC addresses removed, and which do not have the 48-bit MAC address transmitted as part of the MAC header therefor. Bridged packets are specially coded packets, which do not seem to have an equivalent entity in '000. '000 describes use of a VCI, however, there is no teaching that the MAC address is not used. The MAC address is stored in a cache, in either the central server, a LE-CRP, or both. The Examiner's arguments regarding this claim are noted, however, as there is no teaching nor suggestion of a bridged packet, as recited in the claim, the claim is believed to be allowable.

Claim 9 recites removal of the 48-bit MAC address. '000 col. 10, lines 40-50 are applied. The Examiner contends that mapping a MAC address to an ATM address is equivalent to removing a MAC address in a MAC header. The Examiner may be correct, however, the applied portion of '000 does not teach nor suggest any removal of the MAC address in the header; it states that the MAC address is mapped to an ATM address. There is nothing in this portion of '000 to teach or suggest that the MAC address is removed. Claim 9 is allowable over the applied art.

Claims 10 and 11 are allowable with their allowable parent claims.

Claim 12 recites that for packets which are transmitted from the PLC-LAN onto a non-PLC LAN across a bridge device, interworking the packets, including removing the PLC MAC header and forming the LAN MAC header containing the source station 48-bit MAC address and the destination 48-bit MAC address. '000 col. 10, lines 24-35 are applied. This

claim is allowable because the language of '000 applied in rejecting this claim clearly indicates that the MAC header is not removed: it is not used. It is merely encapsulated. This makes sense when looking at col. 10, lines 25-30: how could the MAC address be located in cache 612 if it were not present in the packet? The method of the invention replaces and removes the PLC MAC address with a LAN MAC header containing the source station 48-bit MAC address and the destination 48-bit MAC address. '000 simply stores the MAC header in a number of caches to determine packet routing. Claim 12 is allowable over the applied art.

Claim 13 is allowable with its allowable parent claims.

Claim 14 is allowable for the reasons set forth in connection with claims 1, 9 and 10.

Claim 15 is allowable for the reasons set forth in connection with claims 5 and 6.

Claim 16 is allowable for the reasons set forth in connection with claims 3 and 4.

Claim 17 is allowable for the reasons set forth in connection with claims 11 and 12.

Claim 18 is allowable for the reasons set forth in connection with claim 7.

Claim 19 is allowable for the reasons set forth in connection with claim 8.

Claim 20 is allowable for the reasons set forth in connection with claim 13.

Claim 21 is allowable for the reasons set forth in connection with claim 2.

In light of the foregoing amendment and remarks, the Examiner is respectfully requested to reconsider the rejections and objections stated in the Office action, and pass the application to allowance. If the Examiner has any questions regarding the amendment or remarks, the Examiner is invited to contact the undersigned.

Accompanying this Response is a Supplemental IDS citing art discovered during

prosecution of the EPO counterpart of this Application.

Provisional Request for Extension of time in Which to Respond

Should this response be deemed to be untimely, Applicants hereby request an extension of time under 37 C.F.R. § 1.136. The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any over-payment to Account No. 22-0258.

Customer Number

55376

Respectfully Submitted,

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I hereby certify that the attached RESPONSE TO OFFICE ACTION UNDER 37 C.F.R. § 1.111 and Supplemental IDS is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to:

MS AMENDMENT
Commissioner for Patents
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